

EXAMINATION OF EVIDENCE WITH A STEREOMICROSCOPE

A. SCOPE

- A.1 There are two basic types of microscopes: compound and stereo. Unlike a compound microscope that uses transmitted light and provides a two-dimensional image, stereomicroscopes use incident light and offer the viewer a three-dimensional visualization of the sample being examined. Stereomicroscopes use lower power than compound microscopes and typically have magnification levels ranging from approximately 5 to 60x. These microscopes are particularly useful in various forensic science applications including the screening of hair roots, fingernail clippings and scrapers, clothing, and weapons. The Primary Exam Section has three Leica stereomicroscopes with the following model numbers: MZ8, MZ95, and M3Z. While these stereomicroscopes are all slightly different, the same basic procedure can be followed for each.

B. QUALITY CONTROL

Not applicable

C. SAFETY

- C.1 Treat all biological samples as potentially infectious. Gloves, a face mask, and a lab coat must be worn.
- C.2 To prevent an explosion and blinding light exposure, never open the lamp housing while the lamp is switched on.
- C.3 Before opening the lamp housing, allow it to cool off for at least 15 minutes.
- C.4 Never cover the air duct on the lamp housing as this can lead to a fire.

D. REAGENTS, STANDARDS AND CONTROLS

- D.1 70% Ethanol (decontamination)

E. EQUIPMENT

- E.1 Leica MZ8 stereomicroscope
- E.2 Leica MZ95 stereomicroscope
- E.3 Leica M3Z stereomicroscope

F. PROCEDURES

- F.1 Switch on the stereomicroscope's light source. The M3Z switch is on the back of the attached ring light. The MZ8 and MZ95 switches are on the illumination units attached to these stereomicroscopes. The brightness of the light source on these two stereomicroscopes can be adjusted by using the dials on the units.

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- F.2 Adjust the interpupillary distance for the eyepieces by pushing the eyepieces together or apart. Interpupillary distance varies from person to person; therefore, each observer should make this adjustment before using the stereomicroscope for the best quality image. The interpupillary distance is correctly set if a single circular image field is observed when looking at a sample.
- F.3 Dioptic correction is used to compensate for the difference between a person's eyes. Each user can adjust the diopter settings prior to using the stereomicroscope to reduce eye strain. To adjust the diopter settings, first set the diopter adjustment rings on both eyepieces to the mid position ("0" diopter settings). Look through the eyepieces and focus on the specimen. Rotate both eyepieces to the maximum value of "+5". Hold one eye closed and rotate the other eyepiece in the "-" direction until the specimen appears sharp. Then open the other eye and correct the diopter setting on the second eyepiece until the image is uniformly sharp.
- F.4 Place the item or area on the item to be examined directly below the objective lens.
- F.5 While looking through the eyepieces, slowly turn the coarse/fine focus knob until the item comes into view. Once the outline of the item is observed, turn the knob even more slowly to focus as sharply as possible. After this initial focusing, the item can be moved around to see other parts. However, with three-dimensional items possessing different levels, every feature cannot be clearly focused on at the same time.
- F.6 Adjust the magnification to the desired level by rotating the magnification/zoom knob.
- F.7 Upon completion of your examination, turn off the stereomicroscope's light source. Where applicable, turn down the light intensity prior to shutting off the power.
- F.8 The body of the stereomicroscope can be cleaned using either a 70% ethanol solution or warm soapy water, followed by a wipe down with distilled water. The eyepiece and objective lenses can be cleaned with compressed air followed by lens paper moistened with an optic cleaning solution, if necessary.
- F.9 A dust cover should be placed over the stereomicroscope when it is not in use.
- F.10 Should the lamp on a stereomicroscope need to be replaced, the service provider may be contacted.

G. INTERPRETATION GUIDELINES

Not applicable

H. REFERENCES

- H.1 *Leica M-Series User Manual*, Leica Microsystems Ltd., Heerbrugg, Switzerland.
- H.2 Moira Taupin, J. and Cwiklik, C. *Scientific Protocols for Forensic Examination of Clothing*, Boca Raton, FL: CRC Press, 2011.

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